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File Leaflet Rocket

PROGRESS REPORT
ON
4" ROCKET
FOR
FEBRUARY 1955

31 March 1955

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Work during the month of February was confined mostly to the construction and testing of flight models of the four inch rocket.

Most of the models manufactured and tested were of the same basic design consisting of six canted tubes each with 4 inch long grains calculated to propel the projectile for a distance of 500 yards.

The first three units tested during the month employed heads and caps made from a combination of rigid and flexible polyester resins using fiberglass cloth as a reinforcing medium. The cap was designed with a molded "O" ring groove, although no great care was taken to see that the glass cloth was molded to the contour of the groove. Failure to do this furnishes the most logical explanation of the resultant failures due to the "O" ring being extruded. The shoulder beyond the "O" ring groove was sheared off in each instance. Visual examination of these pieces following the firings showed clearly that this shoulder contained no reinforcement but was composed of plastic alone.

In preparing parts for succeeding models particular attention was given to the reinforcement of this area.

The next three units fabricated, employed the usual six motor tubes with powder calculated to propel the projectile for approximately 500 yards.

The first was made with both epoxy head and cap. This unit failed due to extrusion of the "O" ring at the juncture of the two pieces. The "O" ring groove had been machined into the head plate, thereby servering glass cloth threads.

The second unit employed an epoxy head plate with a polyester cap. Due to below freezing temperature it was noted just prior to test firing that the epoxy head had warped. Upon firing, this unit failed when three of the motor tubes were blown out.

The third unit of this series was the same unit which had been previously fired statically on a number of occasions and was successfully flown in an earlier series of tests. This unit employed straight motor tubes with canted nozzles. When fired, this rocket

flew for approximately 1400 feet. It was noted by observers that during the first portion of flight the projectile was noticeably unstable but as it proceeded along its trajectory it acquired good stability and landed nose first. It is believed that the instability noted was due to the poor fit of the launching tube, there being approximately one-fourth inch gap between the projectile and the walls of the tube.

The next series of rockets tested consisted of four units. The first of this series had an epoxy head and a polyester cap. The tubes were canted at 15°. It was noted before firing this unit that the epoxy head was slightly warped when the head bolts were pulled down tightly. Upon firing, this unit failed when all tubes were blown out.

The second unit was made up with a polyester head and cap. As in most previous models, canted tubes were used. When this unit was fired it failed because one of the six bolts, holding the head and cap together, broke, causing gas leakage around the "O" ring.

The third rocket of this series was made up in the same manner as the second unit just described. When fired it flew for 1400 feet. Its direction of flight was only slightly off to the right not more than two or three degrees. From visual observation the unit flew with excellent stability and landed nose first. The flight time was measured by stop watch at 8.5 seconds.

The fourth unit tested was the same unit which has been fired statically on a number of occasions and was previously flown successfully earlier this month as described in previous paragraphs. As previously stated this unit employed six straight motor tubes with nozzles canted at 15°. This rocket flew for approximately 1650 feet and appeared to the naked eye to fly with good stability all the way. Its direction of flight was approximately 5° to the right of the launching direction. The time of flight was measured at 10.0 seconds.

PLANS FOR FUTURE WORK:

Flight testing of test rockets will continue until a satisfactory design has been established and until consistantly successful flights can be made at the short

range. When this goal has been attained efforts will be made to make units which will reach the longer ranges.

FINANCIAL STATUS:

50X1

Total Amount of Contract	
Expenditures during February 1955	
Total Expenditures to 28 February 1955	
Total Unexpended balance	

Expiration Date of Phase I - 1 May 1955